



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,269	09/09/2003	Mineo Shimotsusa	03500.016072.1	3285

5514 7590 11/29/2004

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER

PHAM, LONG

ART UNIT PAPER NUMBER

2814

DATE MAILED: 11/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/657,269

Applicant(s)

SHIMOTSUSA ET AL.

Examiner

Long Pham

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22-45 is/are pending in the application.
- 4a) Of the above claim(s) 23-25 and 28-45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 22, 26 and 27 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 10/025,674.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/9/03, 4/13/04</u> . | 6) <input checked="" type="checkbox"/> Other: <u>Labeled drawings</u> . |

DETAILED ACTION

General Information

Paper copies of cited U.S. patents and U.S. patent application publications will cease to be mailed to applicants with Office actions as of June 2004. Paper copies of foreign patents and non-patent literature will continue to be included with office actions. These cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy. Requests to restart a period for response due to a missing U.S. patent or patent application publications will not be granted.

General Information

The labeled drawing sheet(s) of the present invention are attached to show examiner's understanding of the disclosed and claimed inventions.

Election/Restrictions

1. Applicant's election with traverse of claims 22, 26, and 27 in the reply filed on 10/13/04 is acknowledged. The traversal is on the ground(s) that see the election of 10/13/04. This is not found persuasive because the searches for inventions recited in claims 22-45 require extensive searching in different classes of inventions.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 22 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art (AAPA) of this application in combination of Choi (US 6,025,237).

AAPA teaches a method for manufacturing a semiconductor device which an electro-thermal conversion element and a switching or driving device for driving or flowing electric current through said the electro-thermal conversion element are integrated in a first conductive type (p) semiconductor substrate. See the Related Background Art pages 1-4 and fig. 38 of this application. However, AAPA fails to teach the steps for forming the switching or driving element as recited in present claim 22.

Choi teaches forming a switch device comprising of (see figs. 1-13 and associated text):

forming a second conductive type (n) semiconductor layer 14 on one principal surface of a semiconductor substrate 12;

forming a gate insulator 28 on said semiconductor layer;

forming a gate electrode 26 on said gate insulator;

doping a first conductive type impurity (p) by utilizing said gate electrode as a mask;

forming a semiconductor region 20a by diffusing said first conductive type impurity; and

forming a second conductive type (n) source region 16 on the surface side of said semiconductor region by utilizing said gate electrode as a mask and a

Art Unit: 2814

second conductive type (n) drain regions 18 on the surface side of said second conductive type (n) semiconductor layer.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to form the switch device as taught by Choi in the process of AAPA to obtain a switch device having high withstand voltage and low on-state resistance. See col. 3, lines 40-50.

Further with respect to claim 26, AAPA teach connecting the drain of switching or driving device to the electro-thermal conversion device. Choi teaches the sources 16 are commonly connected. See fig. 1.

Further with respect to claim 22, AAPA fails to teach forming a plurality of electro-thermal conversion elements and a plurality of switching or driving devices on the same substrate.

However, It would have been obvious to one of ordinary skill in the art of making semiconductor devices to a plurality of electro-thermal conversion elements and a plurality of switching or driving devices on the same substrate to increase the number of devices on single substrate.

4. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choi (US 6,025,237).

Choi teaches a method for manufacturing a semiconductor device, said method comprising the steps of (see figs. 1-13 and associated text):
forming a second conductive type (n) semiconductor layer 14 on one principal surface of a semiconductor substrate 12;
forming a gate insulator 28 on said semiconductor layer;
forming a gate electrode 26 on said gate insulator;
doping a first conductive type impurity (p) by utilizing said gate electrode as a mask;
forming a semiconductor region 20a by diffusing said first conductive type impurity; and

Art Unit: 2814

forming a second conductive type (n) source region 16 on the surface side of said semiconductor region by utilizing said gate electrode as a mask and a second conductive type (n) drain regions 18 on the surface side of said second conductive type (n) semiconductor layer, wherein said method can obtain a transistor structure symmetrical to said source region.

Choi fails to teach that the substrate is doped with p dopant.

However, the doping of substrate with p or n dopant is well-known to one of ordinary skill in the art of making semiconductor devices.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on M-F, 7:30AM-3:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Long Pham

Primary Examiner

Art Unit 2814

Application/Control Number: 10/657,269

Page 6

Art Unit: 2814

LP